Naval Education and Training Command

NAVEDTRA 82149
April 1992
0503-LP-217-7100

Nonresident Training Course (NRTC)

Engineman 2

Only one answer sheet is included in the NRTC. Reproduce the required number of sheets you need or get answer sheets from your ESO or designated officer.

0503LP2177100

Although the words “he,” “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this material.

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

The public may request copies of this document by writing to Superintendent of Documents, Government Printing Office, Washington, DC 20402-0001 or to the Naval Inventory Control Point (NAVICP) - Cog "I" Material, Attention Cash Sales, 700 Robbins Avenue, Philadelphia PA 19111-5098.

COMMANDING OFFICER
NETPDTC
6490 SAUFLEY FIELD RD
PENSACOLA, FL 32509-5237

ERRATA #1 26 July 1999
Stock Ordering No.
0503-LP-217-7101

Specific Instructions and Errata for
Nonresident Training Course

ENGINEMAN 2, NAVEDTRA 82149

1. No attempt has been made to issue corrections for errors in typing, punctuation, etc., that do not affect your ability to answer the question or questions.

2. To receive credit for deleted questions, show this errata to your local course administrator (ESO/scorer). The local course administrator is directed to correct the course and the answer key by indicating the question deleted.

3. Assignment Booklet, NAVEDTRA 82149

Make the following changes:

4-44 ADD the word “rise” after 20°F

4-54 CHANGE “clean oil” to “cleaning fluid”

Delete the following questions, and leave the corresponding space blank on the answer sheet:

Question

4-4

4-63

ENGINEMAN 2
NAVEDTRA 82149

Prepared by the Naval Education and Training Professional Development
and Technology Center (NETPDTC), Pensacola, Florida

Congratulations! By enrolling in this course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program. You have taken an important step in self-improvement. Keep up the good work.

HOW TO COMPLETE THIS COURSE SUCCESSFULLY

ERRATA: If an errata comes with this course, make all indicated changes or corrections before you start any assignment. Do not change or correct the associated text or assignments in any other way.

TEXTBOOK ASSIGNMENTS: The text for this course is *Engineman 2*, NAVEDTRA 12149. The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions in the course. Pay close attention to tables and illustrations because they contain information that will help you understand the text. Read the learning objectives provided at the beginning of each chapter or topic in the text and/or preceding each set of questions in the course. Learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

SELECTING YOUR ANSWERS: After studying the associated text, you should be ready to answer the questions in the assignment. Read each question carefully, then select the BEST answer. Be sure to select your answer from the subject matter in the text. You may refer freely to the text and seek advice and information from others on problems that may arise in the course. However, the answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the same course. Failure to follow these rules can result in suspension from the course and disciplinary action.

ANSWER SHEETS: You must use answer sheets designed for this course (NETPMSA Form 1430/5, Stock Ordering Number 0502-LP-216-0100). Use the answer sheets provided by Educational Services Officer (ESO), or you may reproduce the one in the back of this course booklet.

SUBMITTING COMPLETED ANSWER SHEETS: As a minimum, you should complete at least one assignment per month. Failure to meet this requirement could result in disenrollment from the course. As you complete each assignment, submit the completed answer sheet to your ESO for grading. You may submit more than one answer sheet at a time.

GRADING: Your ESO will grade each answer sheet and notify you of any incorrect answers. The passing score for each assignment is 3.2. If you receive less than 3.2 on any assignment, your ESO will list the questions you answered incorrectly and give you an answer sheet marked "RESUBMIT." You must redo the assignment and complete the RESUBMIT answer sheet. The maximum score you can receive for a resubmitted assignment is 3.2.

COURSE COMPLETION: After you have submitted all the answer sheets and have earned at

least 3.2 on each assignment, your command should give you credit for this course by making the appropriate entry in your service record.

NAVAL RESERVE RETIREMENT CREDIT: If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is evaluated at 6 points. (Refer to BUPERSINST 1001.39 for more information about retirement points.)

STUDENT QUESTIONS: If you have questions concerning the administration of this course, consult your ESO. If you have questions on course content, you may contact NETPDTC at:

DSN: 922-1795
Commercial: (904) 452-1795
FAX: 922-1819
INTERNET: n314.products@smtp.cnet.navy.mil

COURSE OBJECTIVES: In completing this nonresident training course, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following subjects: Administration and Training; Measuring and Repair Instruments; Internal Combustion Engines; Speed Control Devices; Refrigeration and Air Conditioning; Compressed Air Systems; Laundry, Mess Decks, Galley, and Scullery Equipment; Auxiliary Equipment; and Lathe and Machining Operations.

Naval courses may include several types of questions--multiple-choice, true-false, matching, etc. The questions are not grouped by type but by subject matter. They are presented in the same general sequence as the textbook material upon which they are based. This presentation is designed to preserve continuity of thought, permitting step-by-step development of ideas. Not all courses use all of the types of questions available. You can readily identify the type of each question, and the action required, by reviewing of the samples given below.

MULTIPLE-CHOICE QUESTIONS

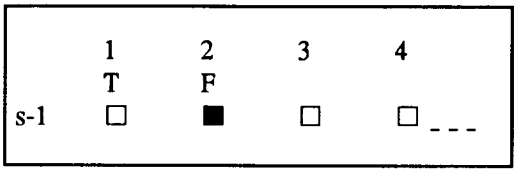
Each question contains several alternative answers. one of which is the best answer to the question. Select the best alternative, and blacken the appropriate box on the answer sheet.

SAMPLE

s-l. The first U.S. Navy nuclear-powered vessel was what type of ship?

1. Carrier
2. Submarine
3. Destroyer
4. Cruiser

Indicate in this way on your answer sheet:



TRUE-FALSE QUESTIONS

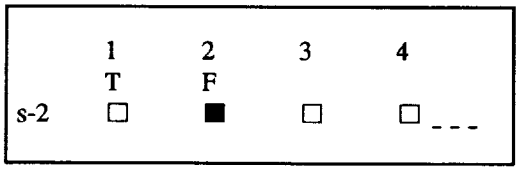
Mark each statement true or false as indicated below. If any part of the statement is false, the entire statement is false. Make your decision, and blacken the appropriate box on the answer sheet.

SAMPLE

s-2. Shock will never be serious enough to cause death.

1. True
2. False

Indicate in this way on your answer sheet:



MATCHING QUESTIONS

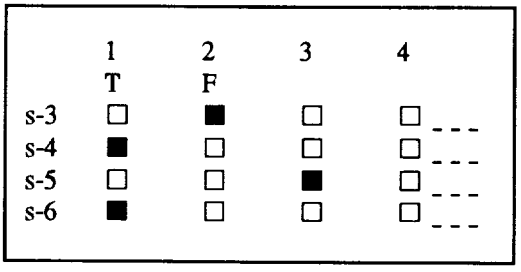
Each set of questions consists of two columns, each listing words, phrases or sentences. Your task is to select the item in column B which is the best match for the item in column A. Items in column B may be used once, more than once, or not at all. Specific instructions are given with each set of questions. Select the numbers identifying the answers and blacken the appropriate boxes on your answer sheet.

SAMPLE

In answering questions s-3 through s-6, SELECT from column B the department where the shipboard officer in column A functions. Responses may be used once, more than once, or not at all.

A. OFFICER	B. DEPARTMENT
s-3. Damage Control Assistant	1. Operations Department
s-4. CIC Officer	2. Engineering Departmnet
s-5. Disbursing Officer	3. Supply Department
s-6. Communications Officer	4. Navigation Department

Indicate in this way on your answer sheet:



ASSIGNMENT 1

Textbook Assignment: "Administration and Training," chapter 1, pages l-l through 1-28.

---

l-l. The standard forms for the logs and records are prepared by the various systems commands and the CNO.

1. True
2. False

1-2. Which of the following entries is NOT required in the Engineering Log?

1. The total engine miles steamed for the day
2. Any injuries to engineering department personnel
3. The amount of fuel consumed for the day
4. Draft and displacement upon getting underway

1-3. Which of the following engineering department records must be preserved as permanent legal records?

1. Engineering Log and Fuel and Water Report
2. Engineer's Bell Book and Monthly Summary
3. Engineering Log and Engineer's Bell Book
4. Machinery History and Boiler Room Operating Record

1-4. Which of the following statements pertaining to the Engineering Log is correct?

1. Remarks must include all minor speed changes and boilers in use
2. Spaces are provided for recording the total engine miles steamed for the day and draft and displacement upon getting underway and anchoring
3. Only erasures that are neat and the reentries that are legible are allowed
4. It must be prepared and signed by the senior petty officer of the watch only

1-5. Instructions for making entries in the Engineering Log are contained in which of the following sources?

1. *Naval Ships' Technical Manual,* chapter 090
2. Type commander's directives
3. Engineering Log form, NAVSHIPS 3120/2D
4. All of the above

1-6. You are in charge of the entire underway watch when Fireman Jones slips and breaks his arm in the engine room. Where should you record this injury?

1. In the Monthly Summary
2. In the Engineering Log
3. In the Engineer's Bell Book
4. All of the above

1-7. If an error is made in an entry to the Engineering Log, what should you do about the erroneous entry?

1. Erase the error and insert the correction
2. Line through the error once, rewrite it correctly, and initial in the margin
3. Underline the error and enter an explanatory note in the margin
4. Circle the error and write an explanatory note at the bottom of the page

1-8. What person is reponsible for reviewing and signing the Engineering Log each day to indicate that all entries are complete and accurate?

1. Petty officer of the watch
2. CPO with the day's duty
3. Engineer officer
4. Main propulsion assistant

1-9. The commanding officer signs the Engineering Log on what calendar day of each month?

1. Fifth
2. Tenth
3. Twentieth
4. Last

1-10. A new series of page numbers added to the Engineering Log are used starting with the first day of each

1. month
2. quarter
3. fiscal year
4. calendar year

1-11. No one may enter changes or additions to the Engineering Log after it has been signed by the commanding officer, without first having obtained permission.

1. True
2. False

1-12. Which of the following statements pertaining to the Engineer's Bell Book is correct?

1. Entries are made in the Bell Book by the throttleman (or an assistant) as soon as an order is received
2. It is a record of all bells, signals, and other orders received by the throttleman
3. Engineer's Bell Book is a legal record compiled by the engineering department
4. Each of the above

1-13. If the bridge signals ahead 1/3 on the engine order telegraph and ahead 35 on the engine revolution telegraph, what entry should the throttleman make in (a) column 2 and (b) column 3 of the Engineer's Bell Book?

1. (a) II; (b) 35
2. (a) I; (b) 2/3
3. (a) I; (b) 35
4. (a) 1/3; (b) 35

1-14. Neat corrections and erasures are permitted in the Engineer's Bell Book if they are made only by the person required to sign the record for the watch and if those changes are neatly initialed in the margin of the page.

1. True
2. False

1-15. The Diesel Engine Operating Record--All Ships (NAVSEA 9231/2) may be destroyed after what minimum length of time??

1. 6 months
2. 12 months
3. 24 months
4. 36 months

1-16. The Daily Fuel and Water Account is maintained by the engineering department for which of the following reasons?

1. It may be used to form the basis of other department's reports
2. It informs selected personnel of the appropriate water usage
3. Both 1 and 2 above
4. It tells the engineer officer the status of the ship's liquid load and forms the basis of engineering reports submitted to the higher authority

1-17. If you are assigned to compute the amount of burnable fuel aboard ship, you should consider which of the following factors?

1. The fuel in the service, storage, and settling tanks
2. The fuel in the service and storage tanks only
3. The fuel above the service and storage tank suction line
4. The fuel above the service tank suction line only

1-18. When computing the amount of burnable fuel on board, all the fuel below the fuel suction line is considered not burnable.

1. True
2. False

1-19. Which of the following engineering department records/reports must be submitted daily to the commanding officer?

1. Daily Boat Fueling Record
2. Daily Engineering Log
3. Fuel and Water Report
4. Each of the above

1-20. After the Monthly Summary has been prepared, what person must verify the fuel received for the month?

1. The commanding officer
2. The supply officer
3. The type commander
4. The engineer officer

1-21. Which of the following statements is true about a ship's Monthly Summary for a given month?

1. The commanding officer signs the copy that goes to the type commander
2. The supply officer prepares the report
3. The engineer officer verifies the fuel receipt figures
4. Each of the above

1-22. Where may you find additional information regarding the use of definitions and explanations in the preparation of the Monthly Summary?

1. Chief engineer instructions
2. CO instructions
3. Fleet commander instructions
4. Supply officer instructions

1-23. Which of the following documents indicates the amount of fuel oil on hand as of midnight, the previous day?

1. Daily Boat Fueling Record
2. Fuel and Water Report
3. Fuel and Water Accounts
4. Diesel Engine Operating Record

1-24. Information about engineering records that must be kept permanently is contained in which of the following publications?

1. Naval Ships' Technical Manual, chapter 080
2. SECNAVINST P5212.5 (revised)
3. NAVSHIPS 5083
4. NAVSHIPS 3648

1-25. The Engineering Log must be retained aboard ship for what minimum length of time?

1. 1 year
2. 2 years
3. 3 years
4. 4 years

1-26. If a ship is scrapped, what disposition is made of the ship's Engineer's Bell Book?

1. It is destroyed
2. It is sent to the nearest Naval Records Management Center
3. It is sent to NAVSHIPS
4. It is sent to BUDOCKS

1-27. A NAVSEA report that has served its purpose and is no longer useful may be destroyed after how many months?

1. 6
2. 12
3. 18
4. 24

1-28. The METER card is composed of how many parts?

1. Five
2. Two
3. Three
4. Four

1-29. What color copy of a completed METER card is sent to the MOCC?

1. Buff
2. Pink
3. White
4. Green

1-30. Which of the following MEASURE reports is sent to you each month as an inventory of all your items?

1. Format 210
2. Format 310
3. Format 350
4. Format 802

1-31. In regards to equipment tag-out procedures, what person is responsible for ensuring the item being tagged is in the prescribed position or condition?

1. The authorizing officer
2. The person attaching the tag
3. The second person
4. The OOD

1-32. Checks and audits of all tag-outs are usually done at which of the following times?

1. At the end of each workday
2. Every Friday
3. Every 2 weeks
4. At the end of each quarter

1-33. When a piece of equipment fails, you must take which of the following actions before repairs can begin?

1. Isolate and tag-out the piece of equipment
2. Notify the commanding officer
3. Submit OPNAV Form 4790.2Q
4. Request permission from the OOD to begin work

1-34. What person specifies the number of tag-out logs needed and their location?

1. The individual force commander
2. The Chief of Naval Operations
3. The commanding officer
4. The engineer officer

1-35. In regard to proper tag-out procedure, what person verifies the completeness of the tag-out action?

1. The person initiating the tag-out
2. The authorizing officer
3. The EOOW
4. The second person that made an independent check

1-36. Before starting the tag-out procedure, the authorizing officer must obtain permission from which of the following individuals?

1. The commanding officer
2. The responsible department head
3. Both 1 and 2 above
4. The type commander

1-37. When repairs have been completed on a piece of equipment, which of the following actions must be taken before it can be tested?

1. Complete the work request
2. Clear the tag
3. Clear the piece of equipment from the out-of-commission log
4. Warm up the system

1-38. Which of the following statements about label and tag enforcement is NOT correct?

1. All outstanding tags listed on each tag-out record sheet must be checked to ensure they are installed correctly
2. Results of audits are reported to the responsible department head
3. Testing the operation of a valve or switch is authorized as part of a routine tag-out audit
4. Spot checks of installed tags are conducted to ensure the tags are effective

1-39. Which of the following methods is used to determine if an engine needs to be overhauled or just temporarily shut down for simple maintenance?

1. The current engine operating data is compared with the previous operating data
2. The operating data of the engine is compared with that of the engine of the same type
3. The temperature of the lube oil entering the cooler is compared to that leaving the cooler
4. The present amount of lube oil consumption is compared with previous lube oil consumption

1-40. What can you determine from a spectrographic analysis?

1. The extent of accelerated wear of an internal combustion engine
2. The amount of oil the engine uses per month
3. The rate of flow of cooling water to the lube oil cooler
4. The amount of oil pressure produced by the lube oil pump

1-41. In regard to ship-to-shop work, who is responsible for witnessing any test required?

1. The ship QA personnel assigned to the job
2. The workcenter representative who requested the work
3. The repair facility supervisor
4. The repair facility quality assurance representative

1-42. When the shipyard or IMA laboratory receives the oil samples, which of the following tests is/are performed?

1. Acid test
2. Physical test
3. Spectrometric analysis
4. Both 2 and 3 above

1-43. You are aboard a destroyer home-ported on the West Coast and you need additional information concerning trend analysis and oil spectrometric analysis. You should refer to what Navy instruction?

1. OPNAVINST 43P1
2. COMNAVSURFLANTINST 9000.1C
3. COMNAVSURFPACINST 4700.1B
4. SECNAVINST P5212.5

1-44. Fresh water is not potable unless it meets which of the following conditions?

1. It is safe for engine operation
2. It is safe for human consumption
3. It is safe for cooling systems
4. It is 100 percent salt-free

1-45. Along with the engineering department, what other department is reponsible for the receipt, distribution, and quality testing of potable water systems?

1. Supply
2. Medical
3. Weapons
4. Operations

1-46. In addition to technical competence, which of the following characteristics should you possess before you can teach others?

1. Ability to organize information
2. Loud, strong voice
3. Formal training as an instructor
4. Each of the above

1-47. Which of the following factors does NOT help to determine the procedures for training a new person in engine-room operations?

1. Ship's operating schedule
2. Number of experienced personnel available
3. Condition of engine-room machinery
4. Trainee's manual skill level

1-48. An Engineman striker who is newly assigned to the engine room is not ready for messenger duty training until he or she becomes familiar with which of the following factors?

1. Duties of the throttleman
2. Technique of reading pressure gauges
3. Procedures of starting or securing the main propulsion plant
4. Locations of all machinery, equipment, piping, and valves

1-49. During what part of an engine-room watchstander's training should a trainee learn how to take gauge readings?

1. While learning the duties of a throttleman
2. While learning the duties of a messenger
3. After becoming proficient with the duties of the throttleman
4. After learning to perform the duties of the throttleman

1-50. When should an Engineman striker be trained to perform the duties of a throttleman?

1. After becoming competent in administrative requirements
2. After becoming proficient in the duties of the messenger
3. While learning the duties of the messenger
4. While learning specific basic safety precautions

1-51. Which of the following factors should be included in the training of engine-room personnel?

1. Consideration of individual difference in the learning rates of personnel
2. Time to be spent on engine theory before manual operation
3. Encouragement of personnel to notice and discuss differences in engine behavior during operation
4. All of the above

1-52. Which of the following factors should be emphasized constantly throughout an engine-room training program?

1. Safety precautions
2. Trial-and-error techniques
3. Emergency repair procedures
4. Machinery characteristics

1-53. What section of the PQS defines the actual duties, assignments, and responsibilities needed for qualification?

1. Fundamentals
2. Systems
3. Watchstations
4. Qualification Card

1-54. What section of the PQS deals with the major working parts of the installation, organization, or equipment?

1. Fundamentals
2. Systems
3. Watchstations
4. Qualification Card

1-55. What is the main purpose of the EOSS?

1. To restore plant operation after a casualty
2. To shorten communication lines to the bridge
3. To recognize the three levels of operation
4. To keep things going smoothly during confusion

1-56. Which of the following information is contained in the Engineering Operational Casualty Control (EOCC) subsystem?

1. Watch qualifications
2. Casualty symptoms
3. Casualty reporting to the type commander
4. Casualty reports to BUMED

1-57. What is the best form of casualty control?

1. Casualty prevention
2. Effective organization
3. Minimizing the casualty
4. Restoring the casualty

1-58. What is the best source for studying engineering casualty control?

1. The Naval Ships' Technical Manual
2. This training manual
3. The Watch, Quarter, and Station Bill
4. The EOCC procedure

1-59. All engine-room watchstanders can increase their ability to control and prevent casualties by studying which of the following publications?

1. The user's guide
2. The EOCC manual
3. The EOP manual, stage I
4. The EOP manual, stage II

1-60. What is the first step you should take when handling a diesel casualty with an inoperative speed governor?

1. Notify the engineer officer and the bridge and request permission to secure the engine for repairs
2. Check the setting of the needle valve
3. Check the linkage for binding or sticking
4. Control the engine manually, if possible

1-61. The Quality Assurance (QA) program was established for which of the following purposes?

1. To provide personnel with information and guidance necessary to administer a uniform policy of maintenance and repairs
2. To provide personnel with necessary information concerning MSD reporting procedures
3. To control casualty reporting procedures
4. To enhance the PQS program

1-62. The QA program organization (Navy) begins with what officer(s)?

1. Type commanders
2. Commanding officers
3. Commander in chief of the fleets
4. QA officer

1-63. Which of the following officers provide(s) instruction, policy, and overall direction for the implementation and operation of the force QA program?

1. Commanding officers only
2. Commander in chief of the fleets
3. Type commanders only
4. Type commanders and commanding officers

1-64. The quality assurance officer (QAO) is responsible to which of the following officers for the organization, administration, and execution of the ship's QA program?

1. Type commander
2. Commander in chief of the fleet
3. Commanding officer
4. Chief engineer

1-65. Which of the following duties is NOT the responsibility of the quality assurance officer?

1. Coordinating the ship's QA training program
2. Maintaining the ship's records of test and inspection reports
3. Conducting QA audits as required
4. Monitoring work procedure for quality assurance

1-66. Which of the following persons are assigned as the ship's quality control inspector?

1. The CO and the division officer
2. The engineer officer and the QAO
3. The work center supervisor and two others from the work center
4. The 3-M coordinator and the LCPO

1-67. Level A assurance provides which of the following levels of assurance?

1. The most stringent of restrictive verification
2. The least verification
3. Limited verification
4. Adequate verification

1-68. Level B assurance provides which of the following levels of assurance?

1. Minimum verification
2. Limited verification
3. The most stringent of restrictive verification
4. Adequate verification

1-69. Which of the following statements is NOT correct about levels of essentiality?

1. They are codes assigned by supply
2. They indicate the degree of impact on the ship's mission
3. They indicate the impact on personnel safety
4. They reflect the degree of confidence that procurement specifications have been met

1-70. What person implemented the system for periodic maintenance of equipment requiring calibration or servicing?

1. Chief of Naval Operations
2. Chief of Naval Education and Training
3. Chief of Naval Material
4. Chief of Naval Personnel

ASSIGNMENT 2

Textbook Assignment: "Measuring and Repair Instruments" and "Internal Combustion Engines," chapters 2 and 3, pages 2-1 through 3-23.

2-1. To ensure accuracy when measuring crankshaft end play, you should take the measurement what minimum number of times?

1. Five
2. Two
3. Three
4. Four

2-2. Which of the following procedures is the correct method to follow when opening a micrometer?

1. Hold the frame with one hand and turn the knurled sleeve with the other hand
2. Twirl the frame
3. Hold the knurled sleeve with both hands and twirl the frame
4. Twirl the knurled sleeve

2-3. Which of the following statements concerning a bore gauge is NOT correct?

1. It gives a direct measurement
2. It is one of the most accurate tools for measuring a cylinder bore
3. It checks the cylinder for out-of-roundness or taper
4. It has two stationary spring-loaded points and an adjustable point

2-4. Why must you expose the bore gauge, the master ring gauge, or other tools used to preset the bore gauge, and the part to be measured to the same environment before measuring?

1. Because it is a good practice to have all the tools and the part to be measured in one place
2. Because a temperature differential may cause your readings to be inaccurate
3. Because by doinq so. you can check what else you need before starting a measurement
4. Because by doing so, this will give you some time to read the bore gauge operating manual

2-5. A strain/deflection gauge is used for which of the following measurements?

1. Crankshaft run-out
2. Crankshaft end play
3. Both 1 and 2 above
4. Crankshaft alignment

2-6. When a strain/deflection gauge is used, readings are generally taken in how many crank positions?

1. Six
2. Five
3. Three
4. Four

2-7. Once you have placed the deflection gauge indicator in position for the first reading. you do not touch the gauge until all the required readings are taken and recorded.

1. True
2. False

2-8. What is the most preferred ratio of the torque multiplier?

1. 5 to 1
2. 2 to 1
3. 3 to 1
4. 4 to 1

2-9. If you use an extension to a torque adapter, how should the torque applied to the part or fastener compare to the torque indicated on the torque wrench?

1. It will be the same
2. It will be greater
3. It will be less

2-10. Before you begin an inspection or test of an engine frame or block, what should you do first?

1. Consult the manufacturer's manual because specific procedures vary with different engines
2. Check the engine's preventive maintenance schedule
3. Clean the outside of the engine thoroughly
4. Warm up the engine

2-11. A dye penetrant test meets the requirements for quality assurance when it is conducted by what person?

1. A QA inspector
2. Any qualified person
3. A certified nondestructive testing technician
4. A well-trained engineman

2-12. Which of the following conditions could indicate a crack in the cylinder liner of an engine?

1. Water standing atop the cylinder's piston after the engine is secured
2. Abnormally high cooling temperature when the engine is operating
3. Large amount of water in the lubricating oil
4. Each of the above

2-13. Which of the following is NOT the result of an improperly cooled cylinder liner?

1. Liner failure
2. Thermal stress
3. Uneven heating
4. Fluctuation in rpm

2-14. Which of the following conditions is NOT a cause for the liner to be improperly seated?

1. Metal chips
2. Oversized liner
3. Nicks or burrs
4. Improper fillets

2-15. Broken piston rings will cause which of the following problems?

1. Scored cylinder liners
2. Connecting bearing failure
3. High lube oil temperature
4. High freshwater temperature

2-16. Which of the following symptoms is an indication of a scored cylinder?

1. High compression pressure
2. Rapid wearing out of strainers and liner parts
3. Low compression pressure
4. Cracked or broken piston rings

2-17. Which of the following conditions will produce out-of-round cylinder liners?

1. Operating the engine at too low a temperature
2. Defective main bearing
3. Piston side thrust
4. Improperly seated head

2-18. How do you determine liner wear?

1. Take piston and liner measurements and qet the difference
2. Take measurements at three levels in the liner
3. Compare wear of piston rings
4. Compare compression readings

2-19. As a precaution against error, it is a good practice for two persons to take the liner measurement and then compare and check any discrepancy between the two sets of readings.

1. True
2. False

2-20. Which of the following conditions is NOT a cause of abnormal liner wear?

1. Insufficient lubrication
2. Dirt in the lube oil
3. Improper starting procedure
4. High cooling water temperature

2-21. Under which of the following conditions are corrosive vapors most likely to condense on the cylinder liner walls of an engine?

1. While operating at temperatures exceeding normal
2. While operating with the lube oil pressure below normal
3. While warming up after it is first started
4. While operating in such a way that normal lube oil pressure is exceeded

2-22. You are removing a cylinder liner from an engine. When fastening the special liner puller to the liner studs, why must you tighten the cap nuts by hand instead of by wrench?

1. Because the nuts cannot be reached with a wrench
2. Because the cylinder liner could be scratched with a wrench
3. Because threads on both nuts and studs could be damaged by a wrench
4. Because there is some danger that a wrench could be left in the cylinder liner

2-23. You are inspecting a cylinder head for cracks. Which of the following is NOT a correct procedure to use?

1. Perform a compression test
2. After bringing the piston of each cylinder to top dead center. apply compressed air
3. Examine by sight or with magnetic powder
4. Perform the hydrostatic test that is used on a water-jacketed cylinder

2-24. The gaskets, which are used between the mating surfaces of the head and the block of an engine, give this joint which of the following characteristics?

1. Acid resistance
2. Protection against leakage
3. Rigidity
4. Correct shape

2-25. What should you do if you discover a warped or distorted cylinder head during an inspection?

1. Machine the head to correct tolerance
2. Replace the head as soon as possible
3. Overtorque the head to compensate for the warpage
4. Reduce the load on the engine

2-26. Which of the following symptoms does NOT indicate fouling in the combustion chambers?

1. Excessive oil pumping
2. Smoky exhaust
3. Loss of power
4. Low compression

2-27. Which of the following valve problems will cause a valve to hang open?

1. Burned valve
2. Floating valve
3. Sticking valve
4. Bent valve

2-28. In a two-stroke cycle engine with aluminum pistons, what is the maximum wear limit for the liner?

1. 0.0015 in. per inch diameter
2. 0.0025 in. per inch diameter
3. 0.0030 in. per inch diameter
4. 0.0050 in. per inch diameter

2-29. Which of the following conditions will NOT cause cracks on an engine cylinder head?

1. Obstruction in the combustion space
2. Restriction of cooling passage
3. Addition of hot water to a cold enqine
4. Improperly tightened studs

2-30. What valve casualty is usually caused by resinous deposits left by improper lube oil or fuel?

1. Burned valves
2. Sticking valves
3. Weak springs
4. Bent valves

2-31. After inspecting the engine intake valves, you discovered that the surface of the valve head has damage. Which of the following casualties is the most probable cause?

1. It is sticking
2. It has a weak spring
3. It is bent
4. It has a loose valve seat

2-32. Which of the following valve casualties will cause the valve to fail to close completely?

1. A burned valve
2. A valve float
3. A sticking valve
4. A valve that has a weak spring

2-33. Failure to properly prepare the counterbore area before placing a valve seat insert in it will cause what problem?

1. Uneven heat transfer between the seat and the counterbore
2. Scratching of the insert
3. Misalignment of the valve head in the seat
4. Loose fit of the insert in the counterbore

2-34. When replacing a valve seat insert, which of the following procedures should you follow?

1. Plan the operation so that the insert is placed slowly and precisely
2. Use boiling water to heat the valve seat
3. Drive the insert down with a special tool
4. Shrink the valve guides or counterbore with dry ice

2-35. Minor pits and flaws may be removed from the valve seat by what method?

1. Buffing
2. Hand grinding
3. Insert replacement
4. Rubbing with prussian blue

2-36. How are valves refaced?

1. On a lathe
2. Against the valve seat
3. By machine qrinding
4. Each of the above

2-37. Which of the following conditions will cause valve springs to break?

1. Compression and corrosion
2. Misalignment and compression
3. Corrosion and fatique
4. Fatique and compression

2-38. Which of the following defects does NOT warrant valve spring replacement?

1. Loss of 2 percent of length
2. Damage to protective coating
3. Hairline cracks
4. Rust pits

2-39. Which of the following results will occur if shims are not properly placed between a valve stem and valve stem cap?

1. Damaged valve stem cap
2. Damaged or broken valve stem
3. Dropped valve
4. Each of the above

2-40. What is the most important factor in keeping a properly adjusted valve actuating gear in good condition?

1. Minimum clearance
2. Control of corrosion
3. Proper materials
4. Adequate lubrication

2-41. If the threads on a rocker arm adjusting screw become worn, what must you do?

1. Replace the rocker arm, screw, and locknut
2. Replace the screw only
3. Replace the screw and locknut only
4. Dress the threads on the screw

2-42. To adjust the tappet to the intake valve of a 4-stroke cycle engine, the piston must be in what position?

1. On the intake stroke
2. On the compression stroke
3. Between the compression and power strokes
4. Between the intake and compression strokes

2-43. What is the most frequent maintenance requirement for rocker arms?

1. Reaming the bushings in the rocker arms
2. Inspecting the rocker arm ends for wear
3. Checking tappet clearances and locknut tightness
4. Replacing tappet adjusting screws and locknuts

2-44. After setting a tappet clearance and locking the adjusting screw with the locknut, what is your next step?

1. Recheck the clearance
2. Adjust the next tappet
3. Warm the engine up and reset the clearance
4. Check the manufacturer's manual to see if the clearance is correct

2-45. When a lash adjuster is adequately supplied with oil, what will most likely cause it to operate noisily?

1. Excessive clearance
2. Broken parts
3. Dirt,resin, or abrasive particles
4. Missing check ball or spring

2-46. Which of the following actions should you take to insert a camshaft into the camshaft recess?

1. Rotate it as you push it in
2. Shake it up and down
3. Apply grease to it
4. Hit it with a sledge

2-47. Why is it necessary to scrape around the top of a cylinder bore before pulling the piston?

1. To remove any metal ridges and carbon deposits
2. To increase clearance for the piston
3. To remove abrasive particles and gum
4. To free the piston rings

2-48. To scrape the top of a cylinder bore before pulling the piston, you should use which of the following tools?

1. A power grinder
2. A file
3. A metal scraper
4. An emery cloth

2-49. When using a brass drift to remove a frozen piston ring, you must avoid damaging which of the following parts?

1. The ring
2. The drift
3. The camshaft
4. The land

2-50. Piston ring gaps are measured (a) with what tool and (b) in what location?

1. (a) A micrometer; (b) on the piston
2. (a) A feeler gauge; (b) in the cylinder liner
3. (a) A feeler gauge; (b) in the vise
4. (a) A micrometer; (b) in the cylinder liner

2-51. In addition to ring gap, what other factor must you measure to ensure correct ring fit?

1. Ring end gap
2. Ring-to-land clearance
3. Ring width
4. Ring circumference

2-52. Operation of an internal combustion engine above the specified temperature limits may result in which of the following problems?

1. Lack of lubrication of the cylinder walls
2. Low cylinder temperatures
3. Increased oil viscosity
4. Low oil temperatures

2-53. If the oil flow to a piston is restricted, where will the deposits caused by oxidation or the oil form?

1. On the underside or the piston crown
2. Behind the compression rings
3. On the piston walls
4. On the topside of the piston crown

2-54. You are installing a new sleeve bearing. Which of the following procedures will make it easier to insert the new sleeve bearing?

1. Apply plenty of grease to the bushing
2. Shrink the piston with dry ice
3. Shrink the sleeve bearing with dry ice
4. Heat the sleeve bearing in the oven

2-55. What is the primary reason piston pin bushings are reamed?

1. To enlarge oil holes
2. To obtain correct lubricating flukes
3. To obtain proper bore clearance
4. To correct oil hole positioning

2-56. To measure the clearance between a piston pin and its bushing, which of the following items should you use?

1. Micrometers
2. Feeler gauges
3. Leads
4. Prussian blue

2-57. When inserting new piston pin bushings, what are the three things you must check?

1. Alignment, clearance, and appearance
2. Cleanliness, appearance, and clearance
3. Appearance, alignment, and cleanliness
4. Cleanliness, alignment, and clearance

2-58. Crankshaft journals that exceed the specified tolerances for out-of-roundness should be refinished by which of the following means?

1. Stoning
2. Grinding
3. Filing
4. Scraping

2-59. A rough spot or slight score on a crankshaft journal should be removed by dressing with which of the following materials?

1. A fine sandpaper
2. A crocus cloth
3. A fine oilstone
4. Both 2 and 3 above

2-60. What instrument is used to take crankweb deflection readings?

1. A feeler gauge
2. An outside micrometer
3. A strain gauge
4. A gauge block

2-61. Impending bearing failures may be indicated by which of the following factors?

1. Lower than normal lubricating oil pressure and temperature
2. Higher than normal lubricating oil pressure and temperature
3. Lower than normal lube oil pressure and higher than normal lube oil temperature
4. Higher than normal lube oil pressure and lower than normal lube oil temperature

2-62. What is the recommended corrective action for journal bearings that have small raised surfaces or minor pits?

1. Replace the bearing
2. Stone down the raised surfaces and fill in the pits with solder
3. Grind the surfaces with a hand grinder
4. Smooth down the surfaces with a bearing scraper

2-63. Before installing new or restored bearings, what should you do?

1. Wipe oil on the journal surfaces only
2. Wipe oil on the bearing surfaces only
3. Ensure that the surfaces are clean and place a film of clean oil on both the journals and bearing surfaces
4. Clean the bearings with solvent and wipe dry

2-64. Certain information is indicated by markings placed on each half of the connecting rod bearings when they are removed from an engine. These markings ensure that the halves will be installed in their original positions. Which or the following is an example of sufficient and necessary information being shown by a marking?

1. No. 2 cylinder
2. No. 2 cylinder. upper half
3. No. 2 cylinder, engine No. 311645
4. Upper half, engine No. 311645

2-65. Which of the following procedures are acceptable for tightening connecting rod bolts?

1. Bolt elongation and bearing cap compression
2. Bearing cap compression and slugging wrench tightening
3. Torque wrench tightening and bolt elongation
4. Slugging wrench tightening and using a wrench extender

2-66. Which of the following means of determining clearances will NOT leave an impression in the soft bearing metal?

1. Leads
2. Shim stock
3. Feeler gauge
4. Plastigage

2-67. Which of the following senses is NOT used by the diesel engine troubleshooter?

1. Smell
2. Sight
3. Hearing
4. Taste

2-68. Frequently, instruments give the first symptoms of trouble. To detect a variation from normal, the troubleshooter must take which of the following actions?

1. Memorize the specified engine-operating instructions
2. Report the instrument readings to the EOOW
3. Read the instruments and record their indications regularly
4. Each of the above

2-69. Which of the following actions will be the greatest aid in detecting minor leakage?

1. Standing watch
2. Conducting material inspection
3. Conducting administrative inspection
4. Conducting routine cleaning

2-70. When a diesel engine can neither be cranked nor barred over, which of the following troubles is most probably indicated?

1. A depleted air supply
2. An open cylinder relief valve
3. An improperly engaged turning gear
4. An out-of-time air-starting motor

2-71. Which of the followinq is a symptom of excessive clearance between a piston and its cylinder.?

1. Piston slap
2. Less oil consumption
3. Minimal carbon deposits
4. Each of the above

2-72. Which of the following factors could cause piston seizure?

1. Excessive temperatures
2. Excessive cooling
3. Decrease in the rate of oxidation
4. Both 2 and 3 above

2-73. The best method for locating cracks in connecting rods is with an inside micrometer.

1. True
2. False

2-74. Which, if any, of the following measurements, indicates that main bearing wear has occurred?

1. Clearance between the bridge gauge and shaft
2. Variation between the measured clearance and the clearance stamped on the bearing housing
3. Variation between last crank web deflation and present
4. None of the above

2-75. When troubleshooting diesel engines, you should associate lack of engine power with which of the following systems?

1. Lubrication
2. Cooling
3. Fuel
4. Each of the above

ASSIGNMENT 3

Textbook Assignment: "Internal Combustion Engines," "Speed Controlling Devices," and "Refrigeration and Air Conditioning," chapters 3, 4, and 5, pages 3-23 through 5-9.

3-1. An engine cannot be cranked, but it can be barred over. Which of the following is the most probable fault?

1. Improper throttle setting
2. Tripped overspeed device
3. Engaged jacking gear interlock
4. Seized piston

3-2. In an engine that cannot be cranked, but can be barred over, which of the following systems is the most probable source of trouble?

1. Starting
2. Fuel
3. Ignition
4. Lubrication

3-3. Which of the following troubles may be detected through the scavenging air port?

1. Stuck piston rings
2. Seized bearing
3. Faulty air-starting distributor
4. Scored bearing

3-4. What causes most of the troubles in a direct mechanical lift air-starting system?

1. Insufficient lubrication
2. Improper adjustments
3. Dirt and gum deposits
4. Inadequate cooling

3-5. On a rotary distributor timing mechanism, what should you use to check the contact between the rotor and the body?

1. Feeler gauge
2. Prussian blue
3. Clearance light
4. Micrometer

3-6. Which of the following practices tends to reduce or eliminate the formation of gummy deposits that cause upper and lower pistons of pressure-activated air-starting valves to stick in the cylinders?

1. Increasing the tension of the valve return springs
2. Draining the storage tanks and water traps of the air-starting system
3. Jacking the engine over manually before starting to free any valves that may be stuck
4. Decreasing the tension of the valve return springs

3-7. If the upper piston of an air-actuated starting valve sticks because of gummy deposits, what action should you take?

1. Force alcohol around the pistons
2. Blow clean hot air around the pistons
3. Put light oil or diesel fuel around the piston and work the valve up and down
4. Remove the piston and buff it with jeweler's rouge

3-8. In general, what should you do if a pressure-actuated air-starting valve is not functioning properly because of a weak return spring?

1. Place another washer on top of the valve stem
2. Replace the castellated nut with a heavier one
3. Restress the valve return spring
4. Install a new valve return spring

3-9. What is the main source of fuel pump and injection system troubles?

1. Contaminated fuel
2. Improper adjustments
3. Coated fuel lines
4. Excessive vibration

3-10. Metal fatigue in the nipples of a fuel system is usually caused by which of the following factors?

1. Leakage
2. High injection pressure
3. Vibration
4. Erosion

3-11. What are the two main causes of leakage in fuel tanks?

1. Corrosion and excessive fuel line pressure
2. Metal fatigue and improper welds
3. Vibration and metal fatigue
4. Clogged fuel lines and corrosion

3-12. Which of the following problems is likely to cause failure of a diesel engine mechanical governor?

1. Faulty oil seals
2. Bound control linkage
3. Defective cold starting valve
4. Low oil level

3-13. Which of the following actions will cause the overspeed safety device of an engine to become inoperative?

1. Trying to start the engine with low air-starting pressure
2. Tripping the device accidentally while trying to start the engine
3. Shutting off the fuel supply after starting the engine
4. Shutting off the air supply after starting the engine

3-14. Most diesel engines are equipped with a special means of cutting off their air or fuel supply in an emergency. In which of the following situations would the special means be used?

1. Engine cannot be cranked or barred over
2. Parts of the exhaust system are obstructed
3. Fuel oil injection system is not properly timed
4. Overspeed safety device does not operate when speed becomes excessive

3-15. Slow cranking of a cold diesel engine may be caused by the use of which of the following substances?

1. Detergent lube oil
2. High viscosity lube oil
3. Centrifuged lube oil
4. Low viscosity lube oil

3-16. What diesel engine system is likely to be at fault if a cylinder misfires regularly?

1. Lubrication
2. Fuel
3. Exhaust
4. Ignition

3-17. A cylinder compression leak is indicated when the pressure in a particular cylinder of an engine signals which of the following conditions?

1. It is much higher than the pressure in the other cylinders
2. It is much lower than the pressure in the other cylinders
3. It fluctuates from normal to much below specified pressure
4. It fluctuates from normal to much above specified pressure

3-18. If the water in the cooling system of a diesel emergency generator overheats because the thermostat fails to function, what corrective action should you take?

1. Clean the bellows of the element
2. Adjust the tension of the regulator spring
3. Clean the freshwater cooler
4. Replace the thermostat

3-19. In the Fulton-Sylphon automatic temperature regulator, what happens if you decrease the spring tension?

1. The velocity of the cooling water decreases
2. The temperature range of the regulator increases
3. The temperature range of the regulator decreases
4. The velocity of the cooling water increases

3-20. Which of the following troubles in the engine exhaust system will cause back pressure?

1. Obstruction in the combustion space
2. Thermostat failure
3. Restricted exhaust
4. Restricted oil filter

3-21. After being cleaned, most oil bath-type engine air cleaners should be refilled to what level?

1. To the full mark
2. Slightly above the full mark
3. To the halfway mark
4. Slightly less than the halfway mark

3-22. Which of the following conditions can damage the turbine blading of a turbocharger?

1. Foreign objects
2. Bearing failure
3. Overspeeding
4. Each of the above

3-23. Which of the following conditions will NOT cause scoring of blower parts?

1. Dirty lube oil
2. Worn gears
3. Improper timing
4. Improper end clearance

3-24. How can you determine whether blower rotor gears are worn excessively?

1. Measure the clearance between the leading and the trailing edges of the rotor lobes
2. Measure the backlash of the gear set
3. Measure the clearance between the rotor lobes and the casing
4. Check the timing of the rotors

3-25. Which of the following conditions is a major contributing factor to diesel engine power loss, starting failure, and frequent stalling?

1. High cooling water temperature
2. Faulty operation of the governor
3. Improperly engaged jacking gear
4. Faulty air-starting distributor

3-26. If you are checking an engine for a stuck fuel control rack, what should you do immediately after disconnecting the linkage to the governor?

1. Visually inspect the rack
2. Try to move the rack by hand
3. Test the return springs
4. Clean the removed rack

3-27. A leaking fuel injector may cause an engine to

1. stop
2. overheat
3. operate better
4. continue to operate when you attempt to shut it down

3-28. Under which of the following conditions will a properly operating engine governor fail to have any control over a sudden increase in speed?

1. Injector leakage during operation
2. Sudden drawing of lube oil into the cylinders from the air box
3. Manifold explosion due to excessive accumulation of oil
4. Inoperative cylinder relief valve due to a stuck spring

3-29. Before installing a new blower oil seal, what must you do to the oil seal first?

1. Wash it in a detergent
2. Spray it with paraffin
3. Blow some air through it
4. Soak it in clean, light lube oil

3-30. What must you do to an improperly operating safety valve when it is removed from an engine cylinder?

1. Reset the spring tension
2. Replace the shear pin
3. Machine and lap the valve
4. Replace it with a new one

3-31. If the exhaust ports of an engine become clogged during operation, which of the following conditions is a possible result?

1. High exhaust temperatures
2. Overheating of the engine
3. Popping of the cylinder safety valves
4. Each of the above

3-32. When cleaning the cylinder ports of an engine, you can prevent carbon from entering the cylinder by performing which of the following actions?

1. Using a vacuum cleaner while brushing off the carbon
2. Jacking the engine over to a position that the piston blocks the port
3. Covering the inside of the cylinder
4. Brushing off the carbon away from the cylinder direction

3-33. What kind of noise will most likely be coming from an engine operating with a broken engine part?

1. Rattling
2. Clicking
3. Pounding
4. Knocking

3-34. The color of the exhaust smoke of an engine can NOT be used as an aid in which of the following circumstances?

1. Troubleshooting
2. Testing for fuel contamination
3. Determining engine performance
4. Determining serious engine troubles

3-35. An explosion may occur if a cigarette is lit near a storage battery because of the presence of

1. hydrogen gas
2. carbon monoxide
3. sulphuric acid
4. gasoline fumes

3-36. Failure of a gasoline engine starting motor to run may be caused by corroded, loose, or burned battery terminals.

1. True
2. False

3-37. When the starting motor of a gasoline engine turns but fails to crank the engine, the trouble is usually found in the

1. drive assembly
2. engine timing
3. fuel system
4. ignition system

3-38. Which of the following problems can result from overpriming a gasoline engine?

1. An overheated engine
2. An inoperative fuel pressure gauge
3. Stuck piston rings
4. Corroded piston crowns

3-39. You are checking for trouble in a fuel system that has a wobble pump. If the pump feels or sounds dry, where is the trouble probably located?

1. In the carburetor
2. In the line to the fuel pump
3. In the fuel pump
4. Between the fuel pump and the supply tanks

3-40. If a gasoline engine with a battery-type ignition system fails to stop, what is the most likely cause?

1. The switch contact points are open
2. The ground connection is open
3. The switch contact points are closed
4. The battery terminals are burned

3-41. Oil purifiers are designed to give maximum efficiency when you operate the purifier at what limits?

1. Minimum speed
2. A speed determined by prevailing conditions
3. A speed between minimum and maximum and below the rated capacity
4. Maximum designed speed and rated capacity

3-42. Most oil used by the Navy can be heated to what maximum temperature without damaging the oil?

1. 195°F
2. 190°F
3. 185°F
4. 180°F

3-43. When the military symbol 9250 lube oil is to be purified, it should be heated to what specific temperature?

1. 140°F
2. 160°F
3. 175°F
4. 180°F

3-44. The size of the discharge ring used in a purifier is determined by which of the following factors?

1. Viscosity of the oil
2. Moisture content of the oil
3. Sediment content of the oil
4. Specific gravity of the oil

3-45. What is the best method of determining the efficiency of a purifier?

1. Oil clarity check
2. Oil analysis
3. Batch process
4. Bowl sediment check

3-46. Which of the following corrective measures should you use to reduce the number of engine governor difficulties?

1. Reduce the engine speed
2. Increase the engine load
3. Use clean oil
4. Adjust the fuel linkage

3-47. When installing a new or overhauled governor, which of the following governor components should you adjust?

1. Governor linkage
2. Compensating needle valve
3. Speed adjusting screw
4. Speeder spring

3-48. When the governor compensating needle valve is correctly adjusted, the engine will behave in which of the following manners during load changes?

1. Maintain low underspeeds
2. Maintain high overspeeds
3. Return slowly to normal speeds
4. Return quickly to normal speeds

3-49. An increase in load for any constant throttle setting of a mechanical governor will be accompanied by a decrease in

1. engine speed
2. spring length
3. fuel pressure
4. oil temperature

3-50. The mechanical governor controls the engine maximum speed when the centrifugal force of both sets of flyweights act against which of the following parts?

1. The buffer spring
2. The light spring
3. The heavy spring
4. Each of the above

3-51. Which of the following is NOT a cause of improper speed fluctuation of an engine equipped with a mechanical governor?

1. Constantly changing loads
2. Misfiring engine cylinders
3. A binding governor linkage
4. High lube oil temperature

3-52. When you are in the process of assembling a governor, which of the following materials is recommended for use on the sealing gasket?

1. Shellac
2. Hard grease
3. Soft grease
4. Lube oil

3-53. An overspeed trip will stop a diesel engine that is equipped with a speed governor when the regular speed governor fails to perform which of the following actions?

1. Limit the load on the engine
2. Keep the engine within its maximum designed limit
3. Adjust to higher engine loads
4. Reduce engine hunt

3-54. A broken drive shaft of a hydraulic overspeed trip will cause uncontrolled engine speed because the flyweights would

1. disconnect from the shaft
2. remain in the distended position
3. cease to exert centrifugal force
4. increase in rotative speed

3-55. What controls the output of a high-speed refrigeration compressor?

1. The box temperature
2. The loading and unloading of compressor cylinders
3. The low-pressure switch
4. The solenoid valve

IN ANSWERING QUESTION 3-56, REFER TO FIGURE 5-3 OF THE TEXTBOOK.

3-56. What will happen when an increase in oil pump pressure causes the piston of the capacity control valve to move against spring A?

1. More cylinders will become loaded and the compressor output will increase
2. More cylinders will become unloaded and the compressor output will decrease
3. The regulating valves will relieve the oil pressure
4. The compressor output will remain the same

3-57. A refrigerant compressor has been overhauled. What is the first step you should take to remove the air from the compressor?

1. Disconnect the connection in the discharged gauge line between the stop valve and the compressor
2. Disconnect the connection on the compressor suction line
3. Start the compressor and let it run until a vacuum is obtained
4. Remove all oil from the compressor crankcase

3-58. You are trying to locate the refrigeration purge valve. Most likely you can find the valve in which of the following locations?

1. At the bottom of the condenser
2. At the top of the condenser
3. At the midsection of the condenser
4. On the condenser gauge line

3-59. In which of the following areas would air that enters a refrigeration plant tend to collect?

1. Upper part of the receiver
2. Upper part of the condenser
3. Inlet end of the condenser
4. Downstream end of the cooling coil

3-60. In a refrigeration system, what is the purpose of the purge valve?

1. To take out unpleasant fumes from the refrigerant
2. To vent off excess refrigerant during an emergency
3. To remove any air that may accumulate in the system
4. To permit the opening of the refrigeration system for cleaning and inspecting

3-61. On an air-cooled condenser, the exterior surfaces of the tubes and fins are dirty and restricting air circulation. Which of the following items should you use to clean these surfaces?

1. Jets of steam
2. Hot-water lances
3. Compressed-air lances
4. Stiff-bristled brushes

3-62. You are testing the condenser tubes for leakage. Why do you hold the exploring tube of the leak detector at one end of each condenser tube for about 10 seconds before driving a cork into each end of the tube?

1. To dry the tube heads
2. To detect the presence of R-12
3. To draw fresh air through the tube
4. To vaporize any water left in the tube

3-63. You are attempting to locate leaks in a refrigeration condenser. Before continuing the tests, you should allow the condenser to remain idle for what minimum period of time after all tubes in the suspected section have been corked?

1. 2 to 4 hr
2. 4 to 6 hr
3. 6 to 8 hr
4. 8 to 10 hr

3-64. When the thermostatic valve is operating properly, how does the temperature at the outlet side of the valve compare with the temperature at the inlet side?

1. The temperature is lower at the outlet side
2. The temperature is lower at the inlet side
3. The temperature is approximately the same at the outlet and the inlet sides

3-65. Which of the following factors can cause a thermostatic expansion valve to operate improperly?

1. A collection of dirt on the control bulb
2. A collection of Freon at the valve seat
3. A collection of dirt at the valve orifice
4. Each of the above

3-66. As a rule, about how many degrees of superheat are picked up by the refrigerant vapor before it leaves the cooling coil?

1. Between 4°F and 12°F
2. Between 15°F and 20°F
3. Between 30°F and 38°F
4. Between 45°F and 50°F

3-67. In a refrigerant plant, liquid refrigerant may flood back to the compressor from the evaporator if the thermostatic expansion valve is in which of the following situations?

1. Stuck shut
2. Adjusted for too high a degree of superheat at the outlet
3. Adjusted for too low a degree of superheat at the outlet

3-68. If you suspect that the expansion valve assembly requires replacement, which of the following conditions should be met before making an expansion valve test?

1. The liquid strainers should be cleaned
2. The solenoid valves should be operational
3. The system should be sufficiently charged
4. All of the above

3-69. A service drum that is used for testing an expansion valve should contain which of the following gases?

1. Pressurized R-12
2. Wet compressed air
3. Oxygen gas
4. Each of the above

3-70. You are testing the thermostatic expansion valve of a refrigeration plant. When should you immerse the thermal element in a bath of crushed ice?

1. Before the valve inlet is attached to the gas source
2. After the high-pressure and low-pressure gauges have been connected
3. Before the high-pressure gauge is connected to the valve outlet
4. After the valve on the air supply line has been opened

3-71. A thermostatic expansion valve is set for 5°F of superheat. What should be the outlet pressure on the gauge?

1. 16.1 psig
2. 22.5 psiq
3. 26.1 psig
4. 32.5 psiq

3-72. Which of the following operating conditions is an indication that the expansion valve is seating properly?

1. Pressure stops increasing after a few pounds
2. Pressure will build up slowly
3. Both 1 and 2 above
4. Pressure increases rapidly and equals the inlet pressure

3-73. You have removed the ice packing from the control bulb. Which of the following outlet pressure conditions indicates that the valve is operating properly?

1. The pressure does not change
2. The pressure decreases rapidly
3. The pressure decreases a few pounds and then stabilizes
4. The pressure increases rapidly

3-74. Under normal operating conditions, the receiver of a properly charged refrigeration system should be at what level when the compressor stops?

1. 25 percent full
2. 50 percent full
3. 85 percent full
4. 100 percent full

3-75. Which of the following actions should you take before tightening the cap on a cleaned liquid line strainer?

1. Test the strainer for leaks
2. Open the strainer outlet valve
3. Purge the air out of the strainer
4. Replace the strainer screen spring

ASSIGNMENT 4

Textbook Assignment: "Refrigeration and Air Conditioning," "Compressed Air Systems," "Laundry, Mess Decks, Galley, and Scullery Equipment," "Other Auxiliary Equipment," and "Lathe and Machining Operations," chapters 5 through 9, pages 5-9 through 9-20.

4-1. Which of the following conditions may be caused by excessive buildup of frost on the cooling coils?

1. Low suction pressure
2. High suction pressure
3. Low suction temperature
4. High condensing pressure

4-2. The maximum time between defrosting of the cooling coils depends on which of the following factors?

1. Amount of refrigerant in the system
2. Moisture content of the supplies placed in the box
3. Amount of heat to be removed
4. All of the above

4-3. You must defrost the cooling coils before the frost reaches what maximum thickness?

1. 1/8 inch
2. 3/16 inch
3. 1/4 inch
4. 5/16 inch

IN ANSWERING QUESTION 4-4, REFER TO FIGURE 5-4 OF THE TEXTBOOK.

4-4. Approximately how many inches of mercury represent the difference in temperature between points B and D?

1. 0.200 inch absolute
2. 0.232 inch absolute
3. 0.436 inch absolute
4. 0.640 inch absolute

4-5. While you are evacuating and dehydrating a refrigeration system, the vacuum indicator fails to attain 35°F. Which of the following conditions may be the cause of this failure?

1. Lack of lubricating oil in the compressor crankcase
2. Lack of moisture in the system
3. Presence of R-12 in the lubricating oil
4. Each of the above

4-6. To be properly reactivated, dehydrating agents should be heated (a) at what specific temperature and (b) for what approximate length of time?

1. (a) 200°F; (b) 12 hr
2. (a) 300°F; (b) 12 hr
3. (a) 400°F; (b) 6 hr
4. (a) 500°F; (b) 6 hr

4-7. If you do not have a tank-type cleaner, you can clean an R-12 system by which of the following methods?

1. By flushing boiling water through the system three times
2. By blowing hot air through the system for 24 hours
3. By inserting a hard, wool felt filter in the suction strainer screen and operating the plant
4. Each of the above methods

4-8. On the two-position, dual control (2PD), which of the following system types uses one common cooling coil to service several different spaces?

1. 1
2. 2
3. 3

4-9. What technique must you use to clean the sensing elements in the humidistats?

1. Use of a soft brush
2. Use of gently blown air
3. Use of a spray of soap and water solution
4. Use of a hard brush

4-10. To correct a low condensing pressure in an operating refrigeration system, you should perform which of the following actions?

1. Reduce the water supply
2. Increase the water pressure
3. Clean the valves and the valve seats
4. Adjust the high-pressure cutout switch

4-11. Insufficient refrigerant in a refrigeration plant may cause which of the following problems?

1. High discharge pressure
2. Low suction pressure
3. Frosting of the crankcase
4. High temperature of the overboard water

4-12. Which of the following actions should you take to correct a low condensing pressure in a refrigeration system?

1. Add refrigerant
2. Purge the condenser
3. Increase the compressor speed
4. Adjust the thermostatic expansion valve

4-13. In an R-12 refrigeration plant, a compressor runs continuously. What is the probable cause?

1. An open solenoid valve switch
2. An inadequate supply of refrigerant
3. Clogged condenser tubes
4. An excess of liquid refrigerant

4-14. Which of the following symptoms indicates that an inadequate supply of water is passing through the condenser of a refrigeration plant?

1. Excessively low temperature of the overboard water and low discharge pressure
2. High suction pressure and high temperature of the suction line
3. High condensing pressure and compressor short cycling on the high-pressure switch
4. High suction line temperature and high discharge pressure

4-15. The cut-in point is set too high on the low-pressure control switch of an R-12 refrigeration system. How will this effect the functioning of the compressor?

1. It will short cycle
2. It will not operate
3. It will operate unloaded
4. It will operate continuously

4-16. Which of the following conditions is probably caused by liquid refrigerant slugging back to the compressor crankcase of a refrigeration system?

1. Bubbles in the refrigerant
2. A sudden loss of oil from the crankcase
3. The compressor continues to operate unloaded
4. Failure of oil to return to the compressor crankcase

4-17. Aboard Navy ships, in which of the following situations would you most likely use MP air?

1. To clean machinery
2. To start diesel engines
3. To operate pneumatic tools
4. Each of the above

4-18. What type of air dehydrator is used to reduce dust problems produced by the other various types?

1. Refrigeration (type I)
2. Desiccant (type II)
3. Activated alumina beads
4. Combination refrigeration and desiccant (type III)

4-19. Which of the following statements is correct about the dehydrator dew point readings?

1. They are taken only to verify suspected operational problems
2. They are taken every 8 hours of dehydrator service
3. They are taken as required by the PMS
4. They are taken every 4 hours of dehydrator service

4-20. Which of the following statements describes the recommended procedures for cleaning an oil-wetted filter element that was removed from a compressor intake?

1. Clean with gasoline or kerosene, dip in lightweight oil, and drain excess oil
2. Clean with steam or strong sal soda solution, dip in clean medium viscosity oil, and drain excess oil
3. Clean with a jet of hot water, dip in kerosene, and drain excess kerosene
4. Clean with kerosene, drain excess kerosene, dip in medium viscosity oil. and drain excess oil

4-21. Leakage through the discharge valves of an air compressor is usually caused by which of the following factors?

1. Dirt in the valves
2. Moisture in the air
3. Overcompression of air in the cylinders
4. Insufficient compression of air in the cylinders

4-22. Carbonized air compressor valves should be cleaned by soaking them in which of the following solvents?

1. Gasoline
2. Solution of kerosene and mineral oil
3. Kerosene only
4. Strong soda solution

4-23. When you are inserting valves in a compressor cylinder, in which of the following directions should the (a) discharge valves and (b) suction valves open?

1. (a) Toward the center;
   (b) away from the center
2. (a) Away from the center of the cylinder;
   (b) toward the center
3. (a) Toward the center of the cylinder;
   (b) toward the center of the cylinder
4. (a) Away from the center of the cylinder;
   (b) away from the center of the cylinder

4-24. What material is used to repack the filter of air compressor control valves?

1. Wool
2. Cotton
3. Linen
4. Nylon

4-25. Which of the following valves of a compressed air system is vital for its safe operation?

1. Control
2. Discharge
3. Suction
4. Relief

4-26. Which of the following checks is NOT a requirement during an inspection of a washing machine?

1. Test for correct steam pressure
2. See that the bolts, nuts, and screws are tight
3. Ensure the machine is level
4. See that the latches on the cylinder doors work properly

4-27. A well-maintained and properly used tumbler will dry a load of laundry in what minimum amount of time?

1. 10 minutes
2. 20 minutes
3. 30 minutes
4. 40 minutes

4-28. Steam kettles safety valves are set to release at what pressure?

1. 15 psig
2. 25 psig
3. 35 psig
4. 45 psig

4-29. Varied operating conditions of the distilling plants are a primary cause of which of the following problems?

1. Changes in feed level
2. Scaling of evaporator tubes
3. Improper liquid level in the first-effect tube nest
4. Excessive steam pressure

4-30. You are making adjustments on distilling plant controls to bring heat and fluid conditions into balance. Which of the following techniques should you use?

1. Adjust all controls simultaneously
2. Adjust all heat controls one at a time and quickly
3. Adjust controls one at a time and in small adjustments
4. Adjust each control at 10-minute intervals

4-31. Which of the following factors is NOT likely to cause a decrease in the distilling plant's efficiency?

1. Air leaks in the first-effect tube nest
2. Low vacuum in the last-effect shell
3. Dirty circulating water strainer
4. No undue deposits inside the tubes

4-32. You should inspect distilling plant steam orifices a minimum of how often?

1. Monthly
2. Twice a year
3. Annually
4. At each overhaul

4-33. From which of the following sources should you take water to be used to desuperheat live steam?

1. The first-effect tube nest drain pump
2. The second-effect tube nest drain pump
3. The freshwater supply
4. The steam feed system

4-34. Fluctuations in the first-effect steam pressure and temperature will cause similar fluctuations in which of the following parts of the plant?

1. The second-effect shell only
2. The steam supply line only
3. The water levels only
4. The entire plant

4-35. When you keep the vacuum in the first-effect tube nest of a distilling plant as high as possible, you will reduce which of the following factors?

1. The amount of brine pumped overboard
2. The pressure rate of the steam lines
3. The rate of evaporator tube scaling
4. The rate of distillate formation

4-36. When you cannot feed water into the first-effect tube nest of a distilling plant, you should look for which of the following causes?

1. Scale deposits in the air ejector
2. Scale deposits in the vapor feed heater
3. Obstructions in the feed line
4. Each of the above

4-37. Once the distilling plant is in operation, which of the following problems is/are likely to cause priming?

1. A sudden rise of the water level
2. A water level that is too high
3. Both 1 and 2 above
4. A sudden drop in the water level

4-38. The vacuum gauge readings are nearly identical on the first- and second-effect shells of a distilling plant. What is the most likely cause?

1. Air leaks between the first and second effect
2. Equally low water levels in both effects
3. Equally high water levels in both effects
4. Obstructions in the flow between the first and second effects

4-39. Improper venting of evaporator tube nests can cause which of the following problems?

1. Condensation of steam in the vapor feed heater
2. Accumulation of air in the tubes
3. Excessive increase of tube nest steam to the distilling condenser
4. Excessive increase of scale deposits on the evaporator tube nest

4-40. How much scale preventive compound is needed for each 4,000 gallons per day of distilling plant capacity?

1. 1.0 pint
2. 2.0 pints
3. 3.0 pints
4. 1.5 pints

4-41. You have an air leak in the distilling plant last-effect shell and the watch stander has been operating the air ejectors improperly. These conditions can produce which of the following vacuum readings in the last-effect shell?

1. 34 in.Hg
2. 30 in.Hg
3. 26 in.Hg
4. 10 in.Hg

4-42. When a distilling plant is in operation, which of the following vacuum tests should you use on joints?

1. Candle flame
2. Air pressure
3. Soapsuds
4. Hydrostatic

4-43. You must clean air ejector nozzles with which of the following tools?

1. Special reamer
2. Rat-tail file
3. Sharp scraper
4. Metal hole brush

4-44. The temperature of circulating water has exceeded the allowable 20°F as it passes through the distiller condenser. You know that this situation is not normal. What action should you take first?

1. Clean the air ejectors
2. Inspect the condenser circulating water systems
3. Check for improper operating procedures
4. Reset the back pressure-regulating valve

4-45. Which of the following indicators suggest(s) improper drainage of the distiller condenser?

1. The flash chamber gauge line is flooded
2. The first-effect tube nest vacuum is several inches of mercury
3. The plant does not produce the designed output when the orifice is 5 psig
4. Each of the above

4-46. All sources of troubles in electrohydraulic systems fit into one of three categories. Which of the following is NOT a category?

1. Hydraulic
2. Cooling
3. Electrical
4. Mechanical

4-47. What is the recommended method for locating small internal leaks in hydraulic systems?

1. Use magnetic flux
2. Install pressure gauges
3. Listen for identifying sounds
4. Visually inspect the disassembled parts

4-48. A popping or sputtering noise in a hydraulic system indicates which of the following conditions?

1. An oil leak in the pressure line
2. An air leak in the pressure line
3. An air leak in the suction line
4. An air pocket in the cylinder

4-49. Which of the following conditions should you suspect if a pounding or rattling noise occurs in a hydraulic system?

1. Overtight adjustment of parts
2. Defective spring-activated valve
3. Improperly adjusted relief valve
4. Overloaded system or high-speed operation

4-50. Foreign matter in the oil of a hydraulic transmission usually causes which of the following types of noise?

1. Rattling
2. Popping
3. Squealing
4. Grinding

4-51. When a squealing or squeaking noise occurs in a hydraulic system, it is usually caused by which of the following conditions?

1. Wiped bearings
2. Air pocket in the cylinder
3. Overtight packing around moving parts
4. Overloaded system during high-speed operation

4-52. What should you, as an Engineman, do upon discovering a faulty operation of a circuit breaker of a hydraulic system?

1. Repair the circuit breaker
2. Check for excessive binding in the electric motor
3. Replace any damaged equipment in the plant
4. Report the condition to the Electrician's Mate

4-53. If a hydraulic system is left to idle for a long period of time, which of the following difficulties might you expect to develop?

1. Misalignment of linkage
2. Accumulation of sludge
3. External leakage
4. Internal leakage

4-54. What is the purpose of securing a hydraulic system for 1 hour after filling it with clean oil?

1. To permit the settling of foreign matter
2. To dissolve the sludge
3. To permit the venting of air
4. To dissolve corrosive deposits

4-55. Which of the following actions is a part of the procedure for cleaning a hydraulic system?

1. Allow the system to remain idle for 15 minutes after operating it with a light load for 4 minutes
2. Operate the system for 1 hour while it is filled with cleaning fluid
3. Operate the system at high pressure while it is filled with cleaning fluid
4. Dilute the old hydraulic oil with cleaning fluid and operate the system for 15 minutes, then allow the system to remain idle for about 5 minutes

4-56. You are replenishing the hydraulic system with oil. What strainer should you use with the oil?

1. A cheese cloth
2. An aluminum filter
3. A 200-mesh wire screen
4. A 400-mesh wire screen

4-57. If you are filling a hydraulic system and notice water in the oil, which of the following actions should you take?

1. Centrifuge the oil or reject it
2. Run the oil through a 180-mesh wire screen
3. Heat the oil to permit the water to evaporate
4. Allow the oil to stand until the water settles to the bottom

4-58. What material is used to form the shaft seal of most modern hydraulic pumps?

1. Rubber
2. Neoprene
3. Asbestos
4. Flax

4-59. Which of the following conditions can cause the packing of a shaft stuffing box to wear out quickly?

1. Hard packing
2. Rough shaft
3. Shaft deflection
4. Excessive packing

4-60. What is the main purpose of packing a shaft packing gland uniformly and lightly?

1. To allow for cooling and lubrication
2. To prevent scoring of the shaft
3. To prevent leakage of seawater
4. To prevent binding of the shaft

4-61. A routine inspection revealed a leak in the line of a hydraulic system at a flanged joint. If the leak persists after you have tightened the bolts evenly, what corrective action should you take next?

1. Replace the flange
2. Install new packing
3. Inspect the fluids for contaminants
4. Install square-braided asbestos packing

4-62. The relief valve in a hydraulic system leaks. What should you do to the valve seat?

1. Reface it
2. Replace it
3. Regrind it
4. Fit the valve with a seat insert

4-63. The selector switch on the conveyor is improperly set. Which of the following troubles is most likely to occur?

1. Conveyor will not start
2. Conveyor will not hoist
3. Conveyor will run continuously
4. Conveyor will not lower

4-64. The engine lathe in a machine shop should NOT be used for which of the following jobs?

1. Turning and boring
2. Facing and thread cutting
3. Drilling and grinding
4. Bending and shaping

4-65. In ships with a one lathe allowance, what is usually the size of the lathe?

1. 14 in.
2. 16 in.
3. 18 in.
4. 20 in.

4-66. When an engine lathe is used for milling, the workpiece is usually mounted on which of the following lathe parts?

1. Headstock
2. Tailstock spindle
3. Carriage
4. Faceplate

4-67. On an engine lathe, which of the following operations is usually performed with the carriage locked in position?

1. Turning
2. Facing
3. Boring
4. Drilling

4-68. Gears in the apron of an engine lathe are driven by which of the following lathe parts?

1. Control rod
2. Lead rod
3. Reverse rod
4. Feed rod

4-69. Which of the following cutter bits is sometimes ground flat on top so it may be fed in both directions?

1. Left-hand turning tool
2. Right-hand facing tool
3. Square-nosed parting tool
4. Round-nosed turning tool

4-70. What type of lathe chuck can be used to automatically center round workpieces of many sizes?

1. Scroll chuck
2. 4-jaw chuck
3. Standard collet chuck
4. Hexagonal collet chuck

4-71. A carriage stop may be used on an engine lathe to eliminate the need for which of the following actions?

1. Individual measurements of duplicate parts
2. Manually shutting off the automatic feed
3. Setup measurements made directly on the workpiece
4. Variable rates of feed across a workpiece

4-72. Which of the following lubricants is to be used for general machine work on brass or Monel rods?

1. Mineral lard oil
2. Turpentine
3. Soluble oil
4. White lead

4-73. What lathe accessory is used for mounting odd-shaped workpieces that cannot be turned between centers?

1. Mandrel
2. 3-jaw chuck
3. Collet chuck
4. Faceplate

4-74. A depth of cut of 0.040 inch reduces the diameter of a lathe workpiece by what measurement?

1. 0.020 in.
2. 0.040 in.
3. 0.080 in.
4. 0.120 in.

4-75. Shoulders are commonly located with a parting tool to eliminate the need for which of the following steps?

1. Using a pointed turning tool
2. Facing the shoulder
3. Cutting a fillet
4. Measuring during the rough turning

STUDENT COMMENT SHEET

THIS FORM MAY BE USED TO SUGGEST IMPROVEMENTS, REPORT COURSE ERRORS, OR TO REQUEST HELP IF YOU HAVE DIFFICULTY COMPLETING THE COURSE.

NOTE: IF YOU HAVE NO COMMENTS, YOU DO NOT HAVE TO SUBMIT THIS FORM.

Date _____

FROM:

_____
RATE/RANK/GRADE, NAME (FIRST, M.I., LAST)

DSN: _____
Commercial: _____
FAX: _____
INTERNET: _____

_____
STREET ADDRESS, APT #

_____
CITY, STATE, ZIP CODE

To: COMMANDING OFFICER
NETPDTC N314
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

Subj: NRTC ENGINEMAN 2, NAVEDTRA 82149

1. The following comments are hereby submitted:

PRIVACY ACT STATEMENT

UNDER AUTHORITY OF TITLE 5, USC 301, INFORMATION REGARDING YOUR MILITARY STATUS IS REQUESTED TO ASSIST IN PROCESSING YOUR COMMENTS AND IN PREPARING A REPLY. THIS INFORMATION WILL NOT BE DIVULGED WITHOUT WRITTEN AUTHORIZATION TO ANYONE OTHER THAN THOSE WITHIN DOD FOR OFFICIAL USE IN DETERMINING PERFORMANCE.

. . . . . .(Fold along dotted line). . . . . .

. . . . . .(Fold along dotted line). . . . . .

DEPARTMENT OF THE NAVY

COMMANDING OFFICER
NETPDTC N314
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

OFFICIAL BUSINESS

COMMANDING OFFICER
NETPDTC N314
6490 SAUFLEY FIELD RD
PENSACOLA FL 32509-5237

NAVEDTRA 1430/5
Stock Ordering No. 0502-LP-216-0100

PRINT OR TYPE

TITLE_____ NAVEDTRA_____

NAME_____ ADDRESS_____
Last First Middle Street/Ship/Unit/Division, etc.

_____
City or FPO State Zip

RANK/RATE_____ SSN_____ DESIGNATOR_____ ASSIGNMENT NO._____ DATE SUBMITTED_____

☐ USN ☐ USNR ☐ ACTIVE ☐ INACTIVE OTHER (Specify)_____

SCORE

	1 T	2 F	3	4			1 T	2 F	3	4			1 T	2 F	3	4	
1	☐	☐	☐	☐	_____	26	☐	☐	☐	☐	_____	51	☐	☐	☐	☐	_____
2	☐	☐	☐	☐	_____	27	☐	☐	☐	☐	_____	52	☐	☐	☐	☐	_____
3	☐	☐	☐	☐	_____	28	☐	☐	☐	☐	_____	53	☐	☐	☐	☐	_____
4	☐	☐	☐	☐	_____	29	☐	☐	☐	☐	_____	54	☐	☐	☐	☐	_____
5	☐	☐	☐	☐	_____	30	☐	☐	☐	☐	_____	55	☐	☐	☐	☐	_____
6	☐	☐	☐	☐	_____	31	☐	☐	☐	☐	_____	56	☐	☐	☐	☐	_____
7	☐	☐	☐	☐	_____	32	☐	☐	☐	☐	_____	57	☐	☐	☐	☐	_____
8	☐	☐	☐	☐	_____	33	☐	☐	☐	☐	_____	58	☐	☐	☐	☐	_____
9	☐	☐	☐	☐	_____	34	☐	☐	☐	☐	_____	59	☐	☐	☐	☐	_____
10	☐	☐	☐	☐	_____	35	☐	☐	☐	☐	_____	60	☐	☐	☐	☐	_____
11	☐	☐	☐	☐	_____	36	☐	☐	☐	☐	_____	61	☐	☐	☐	☐	_____
12	☐	☐	☐	☐	_____	37	☐	☐	☐	☐	_____	62	☐	☐	☐	☐	_____
13	☐	☐	☐	☐	_____	38	☐	☐	☐	☐	_____	63	☐	☐	☐	☐	_____
14	☐	☐	☐	☐	_____	39	☐	☐	☐	☐	_____	64	☐	☐	☐	☐	_____
15	☐	☐	☐	☐	_____	40	☐	☐	☐	☐	_____	65	☐	☐	☐	☐	_____
16	☐	☐	☐	☐	_____	41	☐	☐	☐	☐	_____	66	☐	☐	☐	☐	_____
17	☐	☐	☐	☐	_____	42	☐	☐	☐	☐	_____	67	☐	☐	☐	☐	_____
18	☐	☐	☐	☐	_____	43	☐	☐	☐	☐	_____	68	☐	☐	☐	☐	_____
19	☐	☐	☐	☐	_____	44	☐	☐	☐	☐	_____	69	☐	☐	☐	☐	_____
20	☐	☐	☐	☐	_____	45	☐	☐	☐	☐	_____	70	☐	☐	☐	☐	_____
21	☐	☐	☐	☐	_____	46	☐	☐	☐	☐	_____	71	☐	☐	☐	☐	_____
22	☐	☐	☐	☐	_____	47	☐	☐	☐	☐	_____	72	☐	☐	☐	☐	_____
23	☐	☐	☐	☐	_____	48	☐	☐	☐	☐	_____	73	☐	☐	☐	☐	_____
24	☐	☐	☐	☐	_____	49	☐	☐	☐	☐	_____	74	☐	☐	☐	☐	_____
25	☐	☐	☐	☐	_____	50	☐	☐	☐	☐	_____	75	☐	☐	☐	☐	_____

THIS FORM MAY BE LOCALLY REPRODUCED